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SHORT COMMUNICATION

ICHTHYOFAUNAL DIVERSITY OF MANJEERA RESERVOIR, MANJEERA WILDLIFE SANCTUARY, TELANGANA, INDIA

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Ichthyofaunal diversity of Manjeera Reservoir, Manjeera Wildlife Sanctuary, Telangana, India

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Abstract: The ichthyofaunal diversity of Manjeera Wildlife Sanctuary in Telangana State was studied between October 2015 and November 2016. A total of 57 species of fish belonging to 42 genera, within 20 families and 11 orders were recorded. The present communication provides an updated ichthyofaunal checklist of Manjeera Reservoir and discusses the threats to fish in Manjeera Wildlife Sanctuary.

Keywords: Checklist, freshwater fish, Godavari river basin, Manjeera river.

Fish are an essential source of protein in human diets and significantly to food security and livelihoods. India contributes to about 7.7% of global fish diversity, of which, 1,668 species are marine, and 994 are freshwater (Froese & Pauly 2019). Freshwater fish diversity of India is distributed in large number of ponds, tanks, lakes, reservoirs, seasonal streams, rivers, and other man-made water bodies, which together comprise an area of 111,690 km² (Bassi et al. 2014).

Telangana State in peninsular India has rich freshwater resources including tanks, reservoirs, and is drained by major rivers such as Godavari and Krishna, and their numerous tributaries. Many ichthyofaunal

studies have been carried out in the rivers of Telangana (Day 1878; Rahimullah 1943a; Rahimullah 1944; Mahmood & Rahimullah 1947; Chacko 1949; David 1963; Jayaram 1981, 1995, 1999, 2010; Barman 1993; Talwar & Jhingran 1991; Menon 1999; Devi & Indra 2003). The most comprehensive study among these is by Barman (1993) (of combined Andhra Pradesh State), who reported 158 freshwater fish species belonging to 68 genera, 27 families, and 10 orders. Compared to river systems, only a few studies are available on the ichthyodiversity of man-made reservoirs and tanks in Telangana (Rahimullah 1943b, 1944; Mahmood & Rahimullah 1947; Chandrasekhar 2004; Rao et al. 2011; Shyamsundar et al. 2017).

Manjeera is one of the important reservoirs in Telangana State, created by the construction of a barrage on Manjeera River near Kalabgur Village, Sangareddy District. The barrage was constructed to ensure water storage, and supply drinking water to the twin cities of Hyderabad and Secunderabad located about 50 km south-east. The reservoir covers an area of 32 km² between Singur and Manjeera dams (Prasad et

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Competing interests: The authors declare no competing interests.

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al. 2018). The reservoir has nine islands with extensive marshy fringes, which also supports submerged and emergent vegetation that is used by both crocodiles and birds. Manjeera Wildlife Sanctuary was declared as a protected area in 1978, to provide a safe haven to the wild population of the vulnerable marsh crocodiles, along with numerous avian, mammalian, and floral diversity (Prasad et al. 2018). The first and the senior author have been documenting the biodiversity of Manjeera Wildlife Sanctuary since 2010 (Prasad et al. 2014, 2018). Through this contribution, we provide baseline information on the ichthyofauna of the Manjeera Wildlife Sanctuary.

MATERIALS AND METHODS

Study Area: Manjeera Wildlife Sanctuary (17.62–17.75°N & 77.92–78.08°E) is located in Sangareddy District, Telangana State, India (Fig. 1). The sanctuary encompasses the reservoir, and the area on either bank of the Manjeera River course, running 26km between Singur and Manjeera dams. The reservoir also supports

submerged and emergent vegetation including species of *Nymphaea*, *Nelumbo*, *Polygonum*, *Hydrilla*, *Pistia* (Prasad et al. 2018). The soil type is red loamy, sandy and fertile black, and the major crops grown include cotton, rice, jowar, maize, and sugarcane. Ambient temperature ranges between 15°C (in winters) and 42°C (in summers), and the rainfall is approximately 1,000–1,100 mm per year (Prasad et al. 2014).

Methods: The study was carried out from October 2015 to November 2016, and the voucher samples were collected from October 2015 to November 2015. We selected four locations (Fig. 1) along the river course, and samples were collected using cast nets (mesh size of 6–12 mm for small size fish, depth of operation 1–2 m), gill nets (mesh size of 40–90 mm for large size fish, depth of operation 3–8 m), and other traditional methods (square-shaped bamboo cage traps) with the help of local fishermen. Specimens were collected, photographed, labelled, and preserved in 4–10 % formalin solution relative to the fish size (Jayaram

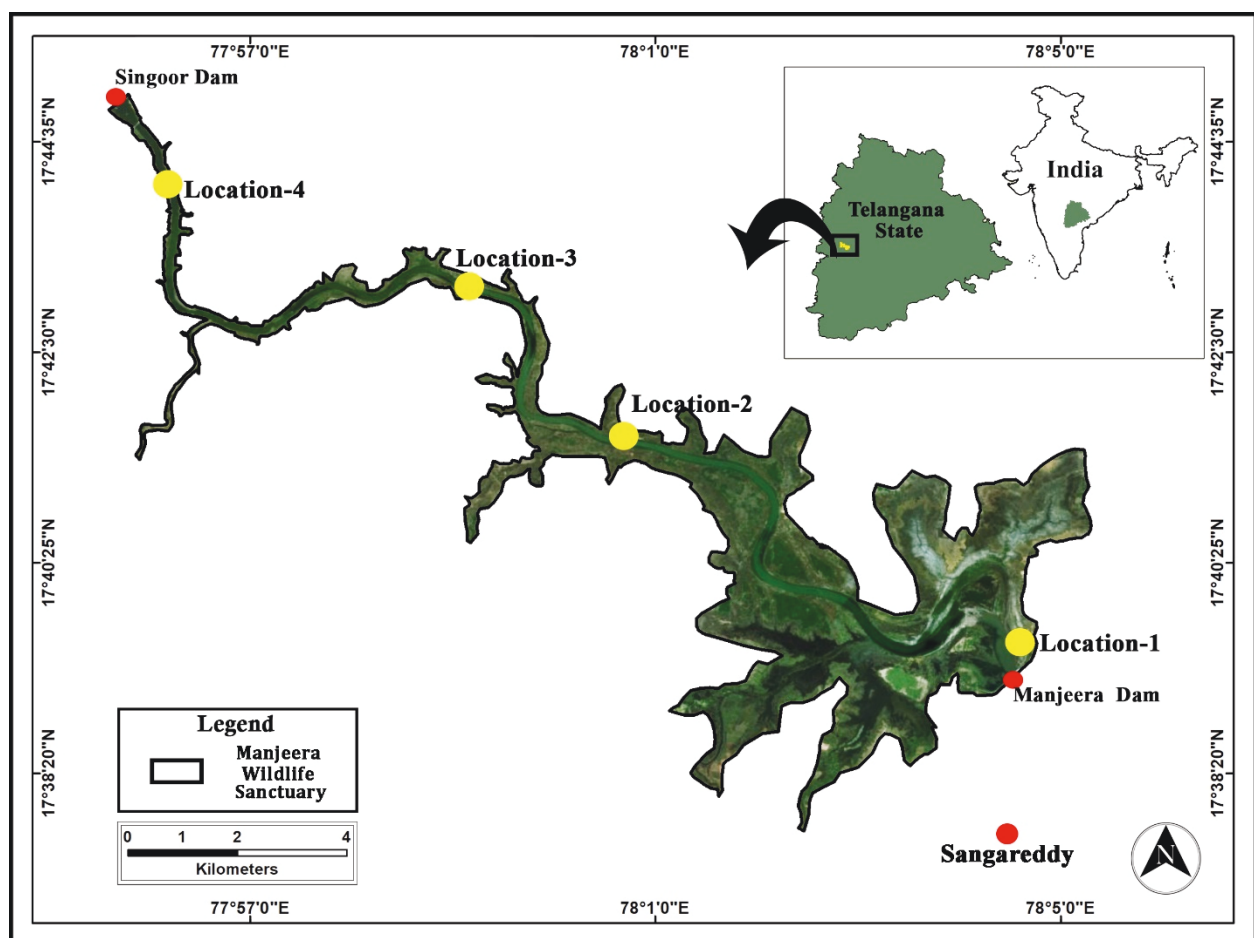


Figure 1. Sampling locations in Manjeera Wildlife Sanctuary, Sangareddy District, Telangana State, India (India and Telangana State are shown for indicative purposes and are not to scale).

2010). Fish were identified up to the species level followed Talwar & Jhingran (1991), Jayaram (1991), Jayaram & Dhas (2000), Jayaram & Sanyal (2003), and Jayaram (2010). Nomenclature of fishes followed Fricke et al. (2019). Voucher specimens and photo vouchers (of those species whose voucher specimens were not collected) are deposited in the Natural History Museum of Osmania University, Department of Zoology, Osmania University, Hyderabad, Telangana State, India (Table 1). Conservation status of the fish species is based on the IUCN Red List of Threatened Species (IUCN 2019).

RESULTS AND DISCUSSION

Manjeera Reservoir (MR) and the Manjeera Wildlife Sanctuary (MWS) harbour a total of 57 species of fish belonging to 42 genera within 20 families and 11 orders (Table 1). During the present study, we collected 51 species of fishes and have included an additional six species that were reported earlier (Barman 1993; Chandrashekar 2004), but not recorded during the present study. Of these, Cyprinidae (33.3%) was the most dominant family followed by Danionidae (14.0%), Bagridae (7.0%), Channidae (5.2%), Cichlidae (5.2%), Ambassidae (5.2%), Cobitidae (3.5%), Siluridae (3.5%), and Mastacembelidae (3.5%).

Most fish species in the MWS are native, and only 8.8% of the fish diversity was represented by exotic species including *Ctenopharyngodon idella*, *Cyprinus carpio*, *Oreochromis mossambicus*, *O. niloticus*, and *Gambusia affinis*. As per the IUCN threat categories, most (S=46) native species were of Least Concern category (80.7% the diversity), and only two species were assessed as Endangered (3.5%). Four species (7.0%) were assessed as Near Threatened (IUCN 2019). Species assessed as threatened included *Tor khudree* and *Clarias magur*, while those assessed as Near Threatened included *Anguilla bengalensis*, *Ompok bimaculatus*, *Wallago attu*, and *Parambassis lala*.

The MR also harbored native aquarium fish species including *Aplocheilichthys panchax*, *Chanda nama*, *Danio rerio*, *Devario aequipinnatus*, *Esomus danrica*, *Hyporhamphus limbatus*, *Oryzias dancena*, *Parambassis ranga*, *Parambassis lala*, *Pseudotropheus maculatus*, and *Puntius vittatus*. The present study revealed the presence of Blue Perch *Badis badis*, which was for the first time reported from Telangana recently (Prasad & Srinivasulu 2019). The abundance of fish species could not be quantitatively assessed due to restriction of the fishing within the sanctuary limits.

Rahimullah (1944) reported 52 valid species of fishes from Manjeera River and its perennial tributaries

of Haldi and Aleru from Medak District of erstwhile Hyderabad State. In the present study from MR, we recorded 28 of the 52 species reported by Rahimullah (1944). Rahimullah (1944) reported the presence of *Silonia childreni*, *Tor khudree*, and *Hypselobarbus mussullah* from Manjeera river, which we failed to detect during the present study. Chandrasekhar (2004) reported only eight species of fish from MR, of which we were unable to detect *Cyprinus carpio*, *Labeo fimbriatus*, *Lepidocephalichthys guntea*, *Salmostoma untrahi*, *Sperata aor*, and *Tor khudree*.

Rao et al. (2011) reported 25 species from Pocharam Reservoir, which is fed by the Aleru River (one of the tributaries of Manjeera River). Both the Pocharam and Manjeera reservoirs are dominated by the species belonging to the order Cypriniformes followed by Siluriformes, though the present study indicated that MR harbours more fish species compared to Pocharam Reservoir.

As part of our study, we also observed some threats to the fish fauna of the sanctuary. Habitat loss due to encroachments such as alteration of riverbanks, construction of canals, expansion of adjacent paddy fields into the sanctuary, and also loss of riparian vegetation for local firewood collection has been noticed as a significant threat to the habitat. Fishing within the sanctuary has been banned by the Telangana State Forest Department, however, illegal fishing activity is still a threat to fish diversity within the sanctuary limits. It is suspected that the excessive use of pesticides and inorganic fertilizers in agricultural fields adjacent to the sanctuary may also lead to water pollution (Prasad et al. 2014). Mitigating such causes that lead to decline in water quality will go a long way and help sustain and improve the ichthyofaunal diversity of MR and MWS, which is home to one of the healthiest population of marsh crocodiles in Telangana State.

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Table 1. List of fishes of the Manjeera Reservoir and Manjeera Wildlife Sanctuary, Telangana, India

	Scientific name	English name	IUCN status	Voucher number
Order Anguilliformes				
Family Anguillidae				
1	<i>Anguilla bengalensis</i> (Gray, 1831)	Indian Mottled Eel	NT	NHMOU.F.PV.92
Order Osteoglossiformes				
Family Notopteridae				
2	<i>Notopterus notopterus</i> (Pallas, 1769)	Bronze Featherback	LC	NHMOU.F.56
Order Cypriniformes				
Family Cobitidae				
3	<i>Lepidocephalichthys guntea</i> (Hamilton, 1822)	Guntea Loach	LC	vide Chandrasekhar (2004)
4	<i>Lepidocephalichthys thermalis</i> (Valenciennes, 1846)	Common Spiny Loach	LC	NHMOU.F.32
Family Cyprinidae				
5	<i>Cirrhinus mrigala</i> (Hamilton, 1822)	Mrigala	LC	NHMOU.F.48
6	<i>Cirrhinus reba</i> (Hamilton, 1807)	Reba Carp	LC	NHMOU.F.47, and 186
7	<i>Ctenopharyngodon idella</i> (Valenciennes, 1844)	Grass Carp	*	NHMOU.F.PV.75
8	<i>Cyprinus carpio</i> Linnaeus, 1758	Common Carp	*	vide Barman (1993)
9	<i>Garra mullya</i> (Sykes, 1839)	Sucker Fish	LC	NHMOU.F.174
10	<i>Gymnostomus ariza</i> (Hamilton, 1807)	Reba	LC	NHMOU.F.PV.90
11	<i>Labeo calbasu</i> (Hamilton, 1822)	Orangefin Labeo	LC	NHMOU.F.PV.94
12	<i>Labeo catla</i> (Hamilton, 1822)	Catla	LC	NHMOU.F.PV.41
13	<i>Labeo fimbriatus</i> (Bloch, 1795)	Fringed-lipped Peninsula Carp	LC	vide Barman (1993)
14	<i>Labeo porcellus</i> (Heckel, 1844)	Bombay Labeo	LC	NHMOU.F.49 to 52
15	<i>Labeo rohita</i> (Hamilton, 1822)	Roho Labeo	LC	NHMOU.F.PV.77
16	<i>Osteobrama cotio</i> (Hamilton, 1822)	Cotio	LC	NHMOU.F.30, and 31
17	<i>Pethia conchonius</i> (Hamilton, 1822)	Rosy Barb	LC	NHMOU.F.252
18	<i>Pethia ticto</i> (Hamilton, 1822)	Ticto Barb	LC	NHMOU.F.303 to 305
19	<i>Puntius chola</i> (Hamilton, 1822)	Swamp Barb	LC	NHMOU.F.42
20	<i>Puntius sophore</i> (Hamilton, 1822)	Pool Barb	LC	NHMOU.F.250, and 251
21	<i>Puntius vittatus</i> Day, 1865	Greenstripe Barb	LC	NHMOU.F.239 to 244
22	<i>Systomus sarana</i> (Hamilton, 1822)	Olive Barb	LC	NHMOU.F.46
23	<i>Tor khudree</i> (Sykes, 1839)	Deccan Mahseer	EN	vide Barman (1993)
Family Danionidae				
24	<i>Amblypharyngodon mola</i> (Hamilton, 1822)	Mola Carplet	LC	NHMOU.F.189, and 190
25	<i>Danio rerio</i> (Hamilton, 1822)	Zebra Danio	LC	NHMOU.F.249
26	<i>Devario aequipinnatus</i> (McClelland, 1839)	Giant Danio	LC	NHMOU.F.172
27	<i>Esomus danrica</i> (Hamilton, 1822)	Flying Barb	LC	NHMOU.F.299
28	<i>Laubuka laubuca</i> (Hamilton, 1822)	Indian Glass Barb	LC	NHMOU.F.288
29	<i>Salmostoma bacaila</i> (Hamilton, 1822)	Large Razorbelly Minnow	LC	NHMOU.F.35
30	<i>Salmostoma untrahi</i> (Day, 1869)	Mahanadi Razorbelly Minnow	LC	vide Chandrashaker (2004)
31	<i>Rasbora daniconius</i> (Hamilton, 1822)	Slender Rasbora	LC	NHMOU.F.286, and 287
Order Siluriformes				
Family Bagridae				
32	<i>Mystus cf. bleekeri</i> (Day, 1877)	Day's Mystus	LC	NHMOU.F.62, 178, and 180
33	<i>Mystus vittatus</i> (Bloch, 1794)	Striped Dwarf Catfish	LC	NHMOU.F.61
34	<i>Sperata aor</i> (Hamilton, 1822)	Long-whiskered Catfish	LC	vide Chandrashaker (2004)

	Scientific name	English name	IUCN status	Voucher number
35	<i>Sperata seenghala</i> (Sykes, 1839)	Giant River-Catfish	LC	NHMOU.F.176
Family Siluridae				
36	<i>Ompok bimaculatus</i> (Bloch, 1794)	Butter Catfish	NT	NHMOU.F.57, and 175
37	<i>Wallago attu</i> (Bloch & Schneider, 1801)	Wallago	NT	NHMOU.F.PV.71
Family Heteropneustidae				
38	<i>Heteropneustes fossilis</i> (Bloch, 1794)	Stinging Catfish	LC	NHMOU.F.PV.91
Family Clariidae				
39	<i>Clarias magur</i> (Hamilton, 1822)	Magur	EN	NHMOU.F.PV.95
Family Schilbeidae				
40	<i>Proeutropiichthys taakree</i> (Sykes, 1839)	Indian Taakree	LC	NHMOU.F.33, and 34
Order Gobiiformes				
Family Gobiidae				
41	<i>Glossogobius giuris</i> (Hamilton, 1822)	Tank Goby	LC	NHMOU.F.58, and 216 to 218
Order Synbranchiformes				
Family Mastacembelidae				
42	<i>Macrognathus pancalus</i> Hamilton, 1822	Barred Spiny Eel	LC	NHMOU.F.236
43	<i>Mastacembelus armatus</i> (Lacepède, 1800)	Zig-zag Eel	LC	NHMOU.F.60
Order Anabantiformes				
Family Channidae				
44	<i>Channa marulius</i> (Hamilton, 1822)	Great Snakehead	LC	NHMOU.F.54
45	<i>Channa punctata</i> (Bloch, 1793)	Spotted Snakehead	LC	NHMOU.F.55
46	<i>Channa striata</i> (Bloch, 1793)	Striped Snakehead	LC	NHMOU.F.PV.40
Family Badidae				
47	<i>Badis badis</i> (Hamilton, 1822)	Badis	LC	NHMOU.F.43
Order Cichliformes				
Family Cichlidae				
48	<i>Pseudotropheus maculatus</i> (Bloch, 1795)	Orange Chromide	LC	NHMOU.F.173
49	<i>Oreochromis mossambicus</i> (Peters, 1852)	Mozambique Tilapia	*	NHMOU.F.59
50	<i>Oreochromis niloticus</i> (Linnaeus, 1758)	Nile Tilapia	*	NHMOU.F.171
Order Cyprinodontiformes				
Family Aplocheilidae				
51	<i>Aplocheilichthys panchax</i> (Hamilton, 1822)	Blue Panchax	LC	NHMOU.F.237
Family Poeciliidae				
52	<i>Gambusia affinis</i> (Baird & Girard, 1853)	Mosquitofish	*	NHMOU.F.225 to 229
Order Beloniformes				
Family Hemiramphidae				
53	<i>Hyporhamphus limbatus</i> (Valenciennes, 1847)	Congaturi Halfbeak	LC	NHMOU.F.273 to 276
Family Adrianichthyidae				
54	<i>Oryzias dancena</i> (Hamilton, 1822)	Rice Fish	LC	NHMOU.F.238
Order Perciformes				
Family Ambassidae				
55	<i>Chanda nama</i> Hamilton, 1822	Elongate Glass-Perchlet	LC	NHMOU.F.221 to 224
56	<i>Parambassis ranga</i> (Hamilton, 1822)	Indian Glassy Fish	LC	NHMOU.F.29
57	<i>Parambassis lala</i> (Hamilton, 1822)	Highfin Glassy Perchlet	NT	NHMOU.F.219, and 220

LC—Least Concern | NT—Near Threatened | EN—Endangered | *—Exotic Species | NHMOU.F.—Natural History Museum, Osmania University, Fishes | NHMOU.F.PV—Natural History Museum, Osmania University, Fishes, Photo Voucher.



Image 1. *Anguilla bengalensis* (Gray, 1831)



Image 2. *Notopterus notopterus* (Pallas, 1769)



Image 3. *Lepidocephalichthys thermalis* (Valenciennes, 1846)



Image 4. *Cirrhinus reba* (Hamilton, 1807)



Image 5. *Ctenopharyngodon idella* (Valenciennes, 1844)



Image 6. *Garra mullia* (Sykes, 1839)



Image 7. *Gymnostomus ariza* (Hamilton, 1807)



Image 8. *Labeo calbasu* (Hamilton, 1822)



Image 9. *Labeo catla* (Hamilton, 1822)



Image 10. *Labeo porcellus* (Heckel, 1844)

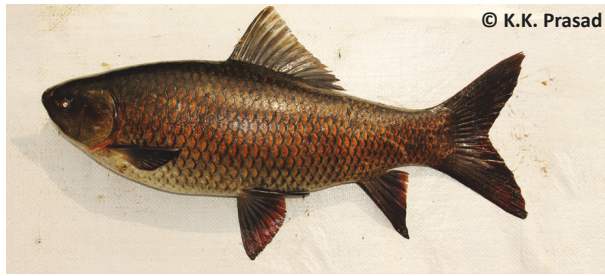


Image 11. *Labeo rohita* (Hamilton, 1822)



Image 12. *Osteobrama cotio* (Hamilton, 1822)



Image 13. *Pethia conchonius* (Hamilton, 1822)



Image 14. *Pethia ticto* (Hamilton, 1822)



Image 15. *Puntius chola* (Hamilton, 1822)



Image 16. *Puntius sophore* (Hamilton, 1822)



Image 17. *Puntius vittatus* Day, 1865



Image 18. *Systomus sarana* (Hamilton, 1822)



Image 19. *Amblypharyngodon mola* (Hamilton, 1822)

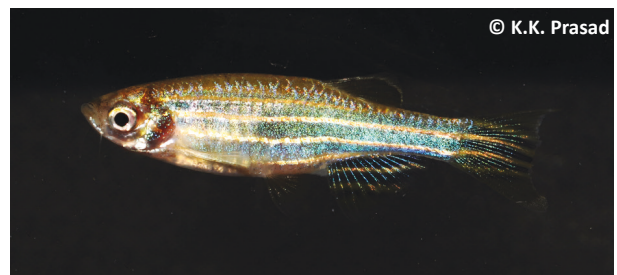


Image 20. *Danio rerio* (Hamilton, 1822)

Image 21. *Devario aequipinnatus* (McClelland, 1839)Image 22. *Esomus danrica* (Hamilton, 1822)Image 23. *Laubuka laubuca* (Hamilton, 1822)Image 24. *Salmostoma bacaila* (Hamilton, 1822)Image 25. *Rasbora daniconius* (Hamilton, 1822)Image 26. *Mystus* cf. *bleekeri* (Day, 1877)Image 27. *Mystus vittatus* (Bloch, 1794)Image 28. *Sperata seenghala* (Sykes, 1839)Image 29. *Ompok bimaculatus* (Bloch, 1794)Image 30. *Wallago attu* (Bloch & Schneider, 1801)

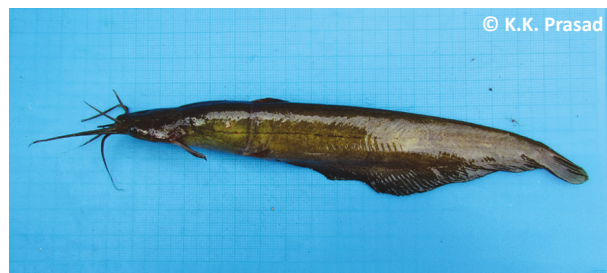
Image 31. *Heteropneustes fossilis* (Bloch, 1794)Image 32. *Clarias magur* (Hamilton, 1822)Image 33. *Proeutropiichthys taakree* (Sykes, 1839)Image 34. *Glossogobius giuris* (Hamilton, 1822)Image 35. *Macrhnathus pancalus* Hamilton, 1822Image 36. *Mastacembelus armatus* (Lacepède, 1800)Image 37. *Channa marulius* (Hamilton, 1822)Image 38. *Channa punctata* (Bloch, 1793)Image 39. *Channa striata* (Bloch, 1793)Image 40. *Badis badis* (Hamilton, 1822)



Image 41. *Pseudotroplus maculatus* (Bloch, 1795)



Image 42. *Oreochromis mossambicus* (Peters, 1852)



Image 43. *Oreochromis niloticus* (Linnaeus, 1758)

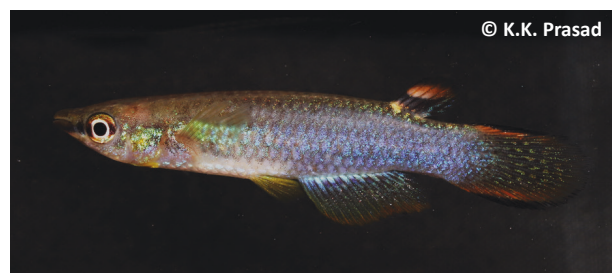


Image 44. *Aplocheilichthys panchax* (Hamilton, 1822)



Image 45. *Gambusia affinis* (Baird & Girard, 1853)



Image 46. *Hyporhamphus limbatus* (Valenciennes, 1847)



Image 47. *Oryzias latipes* (Hamilton, 1822)



Image 48. *Chanda nama* Hamilton, 1822



Image 49. *Parambassis ranga* (Hamilton, 1822)



Image 50. *Parambassis lala* (Hamilton, 1822)



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